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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/540,668

06/24/2005

Emile Johannes Karel Verstegen

NL021487

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06/29/2007

PHILIPS INTELLECTUAL PROPERTY & STANDARDS

P.O. BOX 3001

BRIARCLIFF MANOR, NY 10510

EXAMINER

TYNAN, MATTHEW

ART UNIT

PAPER NUMBER

2871

MAIL DATE

DELIVERY MODE

06/29/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/540,668

Applicant(s)

VERSTEGEN ET AL.

Examiner

Matthew Tynan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 5/31/2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 5/31/2007 have been fully considered but they are not persuasive.
2. Regarding the rejection of claims 1-5, 8-10 and 13 under 35 U.S.C. 102(b) as being anticipated by Murata et al. (U.S. Patent No. 6,288,767), the applicants argue (pg. 8) that Murata et al. does not show a first birefringent layer having an ordinary axis and an extraordinary axis perpendicular to the optical axis. The examiner respectfully disagrees.
3. Referring to Fig. 3, Murata et al. has a first birefringent layer (52) consisting of nematic liquid crystal. As shown in the figure, liquid crystal molecules of the layer 52 are aligned with their long axes perpendicular to the optical axis of the device. Due to the birefringent nature of nematic liquid crystals, there is an extraordinary axis in the direction of the long axis and two ordinary axes in two other orthogonal directions. In other words, as shown in Fig. 3, there is an extraordinary axis and an ordinary axis perpendicular to the optical axis (in addition to another ordinary axis parallel to the optical axis). This description of Fig. 3 conforms with the disclosure of the device operation principles at column 2, paragraph 3.
4. Regarding the rejection of claims 1-10 and 13 under 35 U.S.C. 102(b) as being anticipated by Hikmet (U.S. Patent No. 6,014,197), the applicants argue (pg. 9, paragraphs 1-3) that the reference fails to show "a shaped interface structure arranged between and connecting the first and second birefringent layers." Referring to paragraph 16 of the office action, the examiner notes that the reference to part 41 of Hikmet was a typographical error, and obviously

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so since the examiner subsequently refers to a curved interface in Fig. 4c (regarding claim 2).

The examiner should have referred to Fig. 4.

5. The applicants further argue that there is no interface structure between layers 2 and 7 because “the layer 7... is directly in contact with the layer 2.” However, the examiner notes that the Hikmet discloses that the orientation layers are oriented by means of rubbing in the direction of the grooves in the grating structures or by the method disclosed in U.S. Patent 5,262,882 (col. 4, lines 53-55). Therefore, there is in fact an interface structure between layers 2 and 7.

6. The applicants further argue that Hikmet does not disclose a first birefringent layer having an ordinary and an extraordinary axis substantially perpendicular to the optical axis. However, the section cited by the examiner (col. 4, line 66-col. 5, line 4) discloses that molecules of the layer 7 are oriented to match the refractive indices of the nematic liquid crystal of layer 2. As discussed above, nematic liquid crystal molecules inherently have ordinary and extraordinary axes which define the ordinary and extraordinary refractive indices. As shown in Fig. 1a, in a state in which no voltage is applied, the major axes of the liquid crystal molecules adjacent the layer 7 are arranged substantially parallel to the grating structure of layer 7 and the substrates 3 and 4.

7. The applicants further argue that Yamamoto et al. (U.S. Patent No. 6,095,203) neither discloses nor suggests “capillary cell filling.” This argument is not persuasive.

8. The objection to claim 6 has been overcome by the amendment, and as such it is withdrawn.

Claim Rejections - 35 USC § 102

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9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1,2, 4, 5, 8-10, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Murata et al. (U.S. Patent No. 6,288,767).

11. Regarding claim 1, Murata et al. discloses an optical component comprising:

- A first birefringent layer (52, Fig. 3)
- A second birefringent layer (53).
- A shaped interface structure arranged between and connecting the first and second birefringent layers (41).
- An optical axis passing through the first and second layer.
- The second birefringent layer having molecules movable between a first orientation and a second orientation relative to the optical axis (col. 14, lines 34-48; or see Fig. 3 vs. Fig. 4).
- The refractive index of the second birefringent layer being dependent upon the orientation of the molecules (inherent, since the second birefringent layer comprises nematic liquid crystal).
- The first birefringent layer has an ordinary axis and an extraordinary axis substantially perpendicular to the optical axis (see Fig. 3), as defined by the major and minor axes of the liquid crystal molecules.

12. Regarding claim 2, Murata et al. teaches that the interface (41) is a curved interface.

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13. Regarding claim 4, Murata et al. teaches the first and second layer comprise liquid crystal.

14. Regarding claim 5, Murata et al. teaches the second layer comprises a liquid crystal in the nematic phase (col. 14, lines 40-44).

15. Regarding claim 8, Murata et al. teaches the second orientation (see Fig. 4) corresponds to the second layer having the extraordinary axis parallel to the optical axis.

16. Regarding claim 9, Murata et al. teaches an actuation means (col. 14, lines 45-48) for changing the orientation of the molecules in the second layer.

17. Regarding claim 10, Murata et al. teaches the actuation means comprises at least two electrodes (45, 49; see col. 14, lines 45-48) to apply an electric field to the second layer.

18. Regarding claim 13, Murata et al. teaches a method of manufacturing an optical component comprising a first birefringent layer (52) and a second birefringent layer (53), the method comprising:

- Providing a first birefringent layer.
- Providing a second birefringent layer.
- Inserting a shaped interface structure between the first and second birefringent layers thereby connecting the first and second birefringent layers.
- The molecules of the second birefringent layer are arranged to be movable between a first orientation and a second orientation relative to the optical axis (col. 14, lines 34-48; or see Fig. 3 vs. Fig. 4).
- The first birefringent layer has an ordinary axis and an extraordinary axis substantially perpendicular to the optical axis.

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19. Claims 1, 2, 4-10, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Hikmet (U.S. Patent No. 6,014,197).

20. Regarding claim 1, Hikmet discloses an optical component comprising:

- A first birefringent layer (7)
- A second birefringent layer (2).
- A shaped interface structure (see Fig. 4a-4d; and col. 4, lines 53-55) arranged between and connecting the first and second birefringent layers.
- An optical axis passing through the first and second layer.
- The second birefringent layer having molecules movable between a first orientation and a second orientation relative to the optical axis (col. 4, line 45).
- The refractive index of the second birefringent layer being dependent upon the orientation of the molecules (inherent, since the second birefringent layer comprises nematic liquid crystal).
- The first birefringent layer has an ordinary axis and an extraordinary axis substantially perpendicular to the optical axis.

21. Regarding claim 2, Hikmet teaches that the interface is a curved interface (see Fig. 4c).

22. Regarding claim 4, Hikmet teaches that the second layer (2) comprises liquid crystal.

23. Regarding claim 5, Hikmet teaches that the second layer comprises liquid crystal in the nematic phase.

24. Regarding claim 6, Hikmet teaches that in the first orientation the angle of the molecules of the second layer in a plane perpendicular to the optical axis changes as a function of distance along the optical axis.

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25. Regarding claim 7, Hikmet teaches that the second layer comprises liquid crystal, with the first orientation corresponding to the liquid crystal being in the twisted nematic state (col. 4, line 45 or see Fig. 1a).

26. Regarding claim 8, Hikmet teaches that the second orientation corresponds to the second layer having the extraordinary axis parallel to the optical axis (see Fig. 1b).

27. Regarding claim 9, Hikmet teaches an actuation means (5,6) arranged to change the orientation of the molecules.

28. Regarding claim 10, Hikmet teaches that the actuation means comprises at least two electrodes (5,6) arranged to apply an electric field to the second layer.

29. Regarding claim 13, Hikmet teaches a method of manufacturing an optical component comprising a first birefringent layer (7) and a second birefringent layer (2), the method comprising:

- Providing a first birefringent.
- Providing a second birefringent layer.
- Inserting a shaped interface structure between the first and second birefringent layers thereby connecting the first and second birefringent layers.
- The molecules of the second birefringent layer are arranged to be movable between a first orientation and a second orientation relative to the optical axis (Fig. 1a vs. Fig. 1b).
- The first birefringent layer has an ordinary axis and an extraordinary axis substantially perpendicular to the optical axis.

Claim Rejections - 35 USC § 103

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30. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

31. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murata et al.

(U.S. Patent No. 6,288,767) in view of Yamamoto et al. (U.S. Patent No. 6,095,203).

32. Murata et al. has been discussed above regarding claim 13. Regarding claim 14, Murata et al. provides the second birefringent layer by filling, but does not say that the second birefringent layer is provided by capillary cell filling.

33. However, Yamamoto et al. discloses a method of filling liquid crystal cells including capillary forces that enables injecting liquid crystal uniformly without generating bubbles (col. 5, lines 1-3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method taught by Murata et al. using the filling method taught by Yamamoto et al. in order to uniformly inject the liquid crystal without generating bubbles.

34. Claims 11, 12, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murata et al. (U.S. Patent No. 6,288,767) in view of Tada et al. (U.S. Patent No. 6,370,093).

35. Regarding claim 11, Murata et al. discloses an optical component comprising:

- A first birefringent layer (52, Fig. 3)
- A second birefringent layer (53).
- A shaped interface structure (41) arranged between and connecting the first and second birefringent layers.
- An optical axis passes through the first and second layer.

- The second birefringent layer includes molecules movable between a first orientation and a second orientation relative to the optical axis (col. 14, lines 34-48; or see Fig. 3 vs. Fig. 4).
- The refractive index of the second birefringent layer being dependent upon the orientation of the molecules (inherent, since the second birefringent layer comprises nematic liquid crystal).
- The first birefringent layer has an extraordinary axis substantially perpendicular to the optical axis and an extraordinary axis substantially perpendicular to the optical axis.

36. Murata et al. does not teach an optical scanning device for scanning an information layer comprising a radiation source and an objective system for converging radiation on the information layer.

37. However, Tada et al. discloses an optical scanning device (Fig. 37) for scanning an information layer (e.g. 5, 9, Fig. 37) comprising a radiation source (141) and an objective system (145).

38. Tada et al. further teaches that using a variable focal length device such as that taught by Murata et al. allows electrical signals to be varied to change a focal distance of the multifocal collimator lens to thereby move a focal point of a laser beam through objective lens. This technique can provide focus-jumping faster than the conventional, mechanical technique of moving an objective lens and is also less subject to failures.

39. It would have been obvious to one of ordinary skill in the art at the time the invention was combine the optical component taught by Murata et al. with the optical scanning device

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taught by Tada et al. in order to create a device with focus-jumping faster than the conventional, mechanical technique of moving an objective lens and also less subject to failures.

40. Regarding claim 12, Murata et al. teaches the optical component is a controllable lens.

41. Regarding claim 15, the combination of Murata et al. and Tada et al. teaches:

- Providing a radiation source (Tada et al., 141).
- Providing an objective system (Tada et al., 145).
- Providing an optical component (Murata et al.) comprising:
 - A first birefringent layer (52, Fig. 3) connected to a second birefringent layer (53) by a shaped interface (41).
 - An optical axis passing through the first and second layer.
 - The second birefringent layer having molecules movable between a first orientation and a second orientation relative to the optical axis (col. 14, lines 34-48; or see Fig. 3 vs. Fig. 4).
 - The refractive index of the second birefringent layer being dependent upon the orientation of the molecules (inherent, since the second birefringent layer comprises nematic liquid crystal).
 - The first birefringent layer has an ordinary axis and an extraordinary axis substantially perpendicular to the optical axis.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew Tynan whose telephone number is 571-270-1433. The examiner can normally be reached on Mon-Fri. 7:30-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-4491. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


ANDREW SCHECHTER
PRIMARY EXAMINER